PROGRESS IN OCEANOGRAPHY

VOLUME 21

Editors

MARTIN V. ANGEL

Institute of Oceanographic Sciences, Wormley, Godalming, Surrey

and

ROBERT L. SMITH

School of Oceanography, Oregon State University, Corvallis, Oregon

PERGAMON PRESS

OXFORD · NEW YORK · SEOUL · TOKYO

Progress in Oceanography

Editors

Dr. Martin V. Angel

Institute of Oceanographic Sciences, Wormley, Godalming, Surrey GU8 5UB, U.K.

Professor Robert L. Smith

College of Oceanography, Oregon State University, Corvallis, Oregon 97331-5503, U.S.A.

Associate Editors

I. N. McCave (University of Cambridge, U.K.)

J. Meincke (Universität Hamburg, Germany)

C. B. Miller (Oregon State University, U.S.A.)

D. Schink (Texas A & M University, U.S.A.)

Subscription Rates 1992

Published as 2 volumes per annum of 4 issues each (January, March, May, June, August, September, November, December).

May 1992 issue.

Annual Institutional Subscription Rate (1992): £330.00 (US$600.00). Two-year Institutional Rate (1992/93): £627.00 (US$1140.00). Sterling prices are definitive. US dollar prices are quoted for convenience only, and are subject to exchange rate fluctuation. Prices include postage and insurance and are subject to change without notice. Subscription rates for Japan are available on request.

Specially Reduced Rates to Individuals: Any individual whose institution takes out a library subscription may purchase a second or additional subscription for personal use at a much reduced rate of £54.00.

Subscription enquiries from customers in North America should be sent to Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. *and for the remainder of the world to* Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K.

At the end of the year the Subscriber will receive the annual subject index.

© 1992 Pergamon Press Ltd

Progress in Oceanography is published as 4 issues per volume and 2 volumes per year. It is a specialized journal designed for lengthy papers or collections of papers. Contributions are either a review of an aspect of oceanography or a treatise on an expanding oceanographic subject. The journal is designed to complement the major research journals which publish shorter works.

Publishing/Advertising Offices

Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K.

Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Back Issues

Back issues of all previously published volumes are available direct from Pergamon Press offices.

CONTENTS

The flow of Mediterranean water through the Strait of Gibraltar
L. ARMI and D. M. FARMER 1

The flow of Atlantic water through the Strait of Gibraltar
D. M. FARMER and L. ARMI 1

Aspects of marine microbiology
Guest Editors: E. B. G. JONES and J. D. MILLER 107

Japan and East China seas study
Guest Editor: K. TAKANO 227

Related Pergamon Titles of Interest

Journals

Acta Oceanologica Sinica
Applied Geochemistry
Continental Shelf Research
Deep-Sea Research
Geochimica et Cosmochimica Acta
Marine Pollution Bulletin
Ocean Engineering

Books

BARNES: Oceanography and Marine Biology, Volume 27
DOLMAN: Ports as Nodal Points in a Global Transport System, Pacem in Maribus Volume XVIII
GORSHKOV: World Ocean Atlas
Volume 1: Pacific Ocean
Volume 2: Atlantic and Indian Oceans
Volume 3: Arctic Ocean
OPEN UNIVERSITY COURSE: Volume 1: The Ocean Basins: Their Structure and Evolution
Volume 2: Seawater: Its Composition Properties and Behaviour
Volume 3: Ocean Circulation
Volume 4: Waves, Tides and Shallow-Water Processes
Volume 5: Ocean Chemistry and Deep-Sea Sediments
Volume 6: Case Studies in Oceanography and Marine Affairs
PARSONS *et al*: A Manual of Chemical and Biological Methods for Seawater Analysis
PARSONS *et al*: Biological Oceanographic Processes, 3rd Edition
PICKARD & EMERY: Descriptive Physical Oceanography, 5th Edition
POND & PICKARD: Introductory Dynamical Oceanography, 2nd Edition
RAYMONT: Plankton and Productivity in the Oceans, 2nd Edition Volume 1
TCHERNIA: Descriptive Regional Oceanography
VANDERMEULEN: Ocean Technology, Development, Training and Transfer, Pacem in Maribus Volume XVI
WILLIAMS & ELDER: Fluid Physics for Oceanographers and Physicists

Full details of all Pergamon publications/free specimen copy of any Pergamon journal available on request to your nearest Pergamon office.